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EVOLUTION OF THE WORLD MARITIME INDUSTRY:
THE FLOW OF MATERIAL TO FUTURE THEATERS OF WAR

By

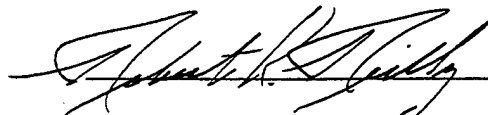
Scott C. Gover
Lieutenant Commander, USN

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The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: Scott C. Gover

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Professor Robert K. Reilly
Professor, JMO Department

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Abstract

EVOLUTION OF THE WORLD MARITIME INDUSTRY: THE FLOW OF MATERIAL TO FUTURE THEATERS OF WAR

Strategic mobility is critical to the success of U.S. national strategy. Historically, U.S. defense commitments have been geographically dispersed requiring sophisticated logistics systems capable of transporting vast amounts of material to distant theaters. Almost all of this material has been transported by sealift. With growing budgetary constraints and reductions in military sealift assets, a growing percentage of U.S. strategic sealift requirements are being satisfied through the use of commercial assets.

While available sealift capacity appeared adequate in past contingency operations like Desert Shield and Desert Storm, these may be unique cases and not representative of environments in which future contingency operations will be conducted. Since the Gulf War, the commercial shipping industry has evolved. This evolution has been driven by economic forces and requires planners to re-evaluate the role of and means by which commercial shipping can be best utilized to fill strategic sealift requirements in the future.

Future sealift plans must be dynamic and evolve with the international commercial shipping industry. The impact of the globalization of the commercial shipping industry, intermodalization, the decline of the U.S. Flag Fleet and the shift in the international maritime labor pool must be factored into all future strategic sealift plans. TRANSCOM must develop new techniques and procedures to make more efficient use of commercial intermodal systems is to meet future strategic sealift requirements.

The focus of this paper is to examine recent developments in the commercial shipping industry and assess their potential impact on the flow of material to future theaters of war. How will TRANSCOM meet the challenges presented by the evolving commercial shipping industry and ensure the efficient flow of material to a future theater of war? Based on this examination, recommendations will be presented which maximize the strategic sealift benefits which can be derived through the utilization of both U.S. and foreign commercial shipping, while minimizing the limitations and risks. This paper will review past strategic sealift requirements and future requirements in support of the National Security Strategy. While the U.S. strategic sealift requirements are satisfied through the combined use of organic military, leased and commercial assets, this paper will only address the contribution of commercial shipping. Recommendations will be developed through an analysis of U.S. future sealift requirements, trends in the U.S. Maritime Industry, the maritime manpower supply, U.S. vessel registry and the globalization of the World Maritime Industry .

Strategic mobility is critical to the success of U.S. national strategy. Historically, U.S. defense commitments have been geographically dispersed requiring sophisticated logistics systems capable of transporting vast amounts of material to distant theaters. Almost all of this material has been transported by sealift. With growing budgetary constraints and reductions in military sealift assets, a growing percentage of U.S. strategic sealift requirements are being satisfied through the use of commercial assets. The material required to sustain forward deployed troops in the future will most likely be transported by commercial carriers. With the ever growing expanse of U.S. defense

commitments and the associated growth of U.S. logistic requirements, sealift will have to be at the forefront of the minds of U.S. Transportation Command (TRANSCOM) planners.

While available sealift capacity appeared adequate in past contingency operations like Desert Shield and Desert Storm, these may be unique cases and not representative of environments in which future contingency operations will be conducted. Future contingency operations may not be conducted in a favorable political climate with multinational support, under a United Nations resolution or allow the orderly buildup of material over several months. Additionally, future adversaries may present a credible threat to U.S. and coalition forces sea lines of communication. Planners must not mistakenly model future contingency operations logistics plans on plans which supported past successful operations. Since the Gulf War, the commercial shipping industry has evolved. This evolution has been driven by economic forces and requires planners to re-evaluate the role of and means by which commercial shipping can be best utilized to fill strategic sealift requirements in the future.

Background

Both in peacetime and in war, the U.S. Department of Defense delivers about 95% of its international cargoes by sea.¹ While Post Cold War reductions in forward deployed forces has increased the volume of deliveries, the changes in wartime requirements are most significant. The loss of forward deployed bases has resulted in a shift in national security policy, which has dramatically increased wartime requirements. Current national security strategy is based on the projection of personnel and their equipment from the continental U.S. to a theater of operations. This strategy is dependent on sealift. Sealift

as an essential element of power projection is broken down into two primary phases, the surge phase and the sustainment phase. Surge shipping of military unit equipment and pre-positioned material is the initial, high-volume, rapid movement of main battle tanks, assault vehicles, artillery, helicopters, truck and immediate combat provisions to "marry up" with troops and aircraft flown into theater.² Sustainment shipping focuses on the resupply of U.S. and coalition forces to meet daily consumption and build up reserve stocks while sustaining combat.³ Military sealift requirements are commonly delineated in terms of the volume the cargo will require in terms of cubic feet or in terms of the deck space the cargo requires in square feet, as would be the case for military vehicles.

Gulf War Sealift

The Gulf War was a monumental logistical undertaking which clearly demonstrated the importance of strategic sealift. It is an essential element of power projection and a force multiplier, without which the best weapons and trained troops are of little utility. The Military Sealift Command chartered 29 U.S. flagged and 162 foreign flagged ships that ultimately delivered 12.3 million square feet of unit equipment and support cargo.⁴ The Gulf War, while highly successful, was fought under what can be considered ideal conditions, conditions that are unlikely to be duplicated in future conflicts. General Hansford Johnson, then-Commander of the U.S. Transportation Command, stated this belief best when he commented on the conduct of the Gulf War by saying, "it worked okay this time, but what if foreign governments don't go along with the operation next time."⁵ The Gulf War, while heralded as a logistical success taught numerous valuable lessons and identified significant deficiencies. Statements by Vice Admiral Paul Butcher, then-Deputy Commander of the U.S. Command, in February

1991, highlighted what may be considered the true underpinnings of our success and foreshadowed future difficulties, "The U.S. enjoyed the best seaports and airports without which the shortfalls in airlift and sealift would have been exposed."⁶

Additionally, the U.S. enjoyed unparalleled host nation and multinational support while facing an adversary incapable of interdicting U.S. or coalition sea lanes of communication.

The vital role played by both U.S. and foreign commercial ships in support of Operation Desert Storm deserves attention. Of the 9.2 million tons of defense related cargo transported to the Gulf, 12.68 percent was carried on U.S. flagged merchant ships and 26.58 percent was carried on foreign flagged ships from 34 countries.⁷ While as a whole shipments were delivered into the gulf on schedule without disruptions, a few isolated incidents demonstrated potential problems associated with reliance on foreign carriers. Of the 162 foreign flagged vessels supporting the U.S. deployment to the Persian Gulf, 13 foreign flagged ships hesitated or refused to carry U.S. cargo into the gulf. The reasons foreign feeder vessel⁸ crews operating for U.S. flagged ship companies under MSC sustainment arrangements refused to enter the combat zone included religious reasons, pay disputes and fear.⁹

Future Sealift Requirements

While past operations such as Desert Shield and Desert Storm provide valuable lessons, it is future strategic lift requirements that deserve our attention. Future strategic lift requirements are driven by U.S. National Security Strategy (NSS). Current NSS calls for strategic sealift assets capable of supporting two nearly simultaneous major regional conflicts (MRCs).¹⁰ The NSS is further delineated in terms of the National Military

Strategy (NMS). This strategy recognizes that with fewer U.S. forces permanently stationed overseas, we must increase our capability to project forces abroad if U.S. forces are going to be capable of responding to two MRCs . Of the four strategic mobility enhancements called for in the NMS, three involve enhanced sealift capabilities. While the NMS identifies the need to improve the pre-positioning and Ready Reserve Forces, it is the requirement to improve surge and sustainment sealift capacity that is of special interest in terms of the scope of this paper. Based on the Mobility Requirement Study Bottom-Up Review, a 5 million square foot military surge sealift capacity shortfall exists.¹¹ U.S strategic sealift requirements in the Post Gulf War era have witnessed:

- Increasing requirements for strategic mobility forces.
- Increased reliance on U.S. government owned sealift to meet surge requirement.
- Near total dependence on privately owned, U.S. commercial fleet for:
 - Sustainment
 - Crewing for Strategic Sealift Ships¹²

Access versus Control

When developing logistic plans required to satisfy sealift requirements, vessel accessibility and level of U.S. control must be considered when selecting carriers. U.S. strategic sealift requirements can be satisfied using U.S. Navy ships and crews, Navy ships with civilian crews, U.S. flagged ships with U.S. crews , U.S. owned ships with foreign crews, foreign ships with foreign crews, or any combination of these. The use of U.S. Navy ships and Navy crews provides the greatest degree of U.S. control, however, it provides limited access due to availability of assets. While the use of foreign ships with

foreign crews provides the greatest degree of accessibility, it also affords the least degree of government control.

Trends in the U.S and International Maritime Industry

The world commercial maritime fleet is evolving. While worldwide sealift capacity has increased, the number of vessels actively engaged in foreign trade has decreased. Sealift capacity is growing primarily by replacing smaller aging ships with newer, large capacity ships. In addition to an increase in the average size of vessels, the industry is moving towards containerization. Currently, the U.S flagged intermodal liner fleet represents 75% of the U.S. flagged fleet conducting foreign trade.¹³ This figure is comparable with the international commercial shipping industrial average of 70%. As a consequence, international and domestic seaborne trade has also affected ship design; modern containerships are not self-sustaining and are of diminished military usefulness. Unlike break-bulk ships, they have no organic cargo handling capability. The absence of cargo cranes allows for greater cargo utilization of the ships. The container revolution represents a change in the fundamental structure of global seaborne transportation. Ships which were once self-sustaining vehicles of international commerce, are now part of a much larger system. The vast cargo carrying capabilities of modern containerships are useless without containers, cargo handling cranes, computerized container tracking systems and access to a shore based infrastructure of both roadways and rail, capable of handling thousands of containers daily.

Modern containerships are growing faster than the port facilities or infrastructures which support them. The Regina Maersk, the most recent addition to the world's largest shipping line, the Maersk Sealand Line, is 1,043 feet long with a 137 foot beam and a 47

foot draft. It is capable of transporting over 6,000 Twenty-Foot Equivalent Units (TEU).¹⁴ TEUs refer to a standard 20 foot by 8 foot by 8 foot ISO container. As containerships grow in size, fewer and fewer ports are capable of supporting them. These vessels require deep draft ports with highly developed supporting infrastructures. The issue of port accessibility is highlighted by the fact that both New York and Norfolk, the largest U.S. North Atlantic ports, have constraints which deny fully loaded container superships access. The main channel entering New York Harbor is 45 feet deep. Norfolk's main channel is 50 feet deep, however, the Chesapeake Bay Channel tunnel is only 40 feet deep. Additionally, as containerships constitute a larger percentage of the commercial fleet engaged in international trade, ports originally designed to handle break bulk ships are being redesigned to handle containerized cargo. There appears to be no end in sight with regards to the ever growing size of containerships. This new generation of ships are referred to as Post-Panamax ships. Post-Panamax ships are a new class of ships whose physical size precludes them from utilizing the Panama Canal. In a recent study, Lloyd's Register and Ocean Shipping Consultants predicted that vessels of 12,500 TEU will be built by 2008.¹⁵

The construction of these "ultra large containerships" is driven by each carrier's need to receive the benefits of scale. This emerging super fleet is designed to operate specifically along the high volume east-west trade routes. These ships create a veritable bridge of ships across the Pacific. Given the limited number of ports which are accessible to these super ships, they are utilized on mainline routes as part of a hub and feeder system. This hub and feeder system is potentially the Achilles heel with respect to U.S. control of military cargo in transit on commercial carriers. While a container may

have left the U.S. on a U.S. flagged vessel, it may be transferred at a hub to a foreign flagged regional carrier for delivery in theater.

The importance of a strong U.S. flagged merchant fleet has long been recognized in terms of providing a vehicle for international commerce and an indispensable source of strategic lift. The desire to maintain a capable U.S. flagged fleet and ensure government control has been the impetus behind the passage of legislation and the development of numerous subsidy programs. The earliest of these laws was the 1920 Merchant Marine Act. The 1920 Merchant Marine Act, otherwise known as the Jones Act, imposes citizenship and construction requirements for vessels to engage in domestic trade. These laws seek to ensure that sufficient maritime resources are available to meet defense deployment and essential economic requirements in support of our national security strategy.¹⁶ The Jones Act fleet accounts for 29 percent of all U.S. flagged containerships, 50 percent of all U.S.-Flag commercial roll-on/roll-off ships and 81 percent of all U.S.-flag tankers.¹⁷

The Sealift Readiness Program (SRP) is a program in which U.S. flag carriers enter into an agreement pledging to commit half their cargo capacity to the program during wartime in return for operating subsidies and the opportunity to bid on military shipping contracts during peacetime.

The Maritime Security Act established the Maritime Security Program (MSP), a national defense sealift program that provides financial assistance to U.S. commercial ocean ship operators, primarily containership operators. The MSP is administered by the Maritime Administration (MARAD) in the U.S. Department of Transportation, in consultation with the U.S. Department of Defense (DoD). Under this program, MARAD

provides total funding of up to \$100 million annually to be divided among 47 vessels. Of the 47 vessels enrolled, 39 of them are containerships.¹⁸ Participating ship owners are required to enroll in an Emergency Preparedness Program established to provide sealift support in time of war or national emergency. Additionally, MSP participants are required to provide the DoD access to their worldwide intermodal networks.¹⁹

The Voluntary Intermodal Sealift Agreement (VISA) Program was a component of the Merchant Marine Act of 1936 and later incorporated into the DoD Sealift Readiness Program in 1997. The objective of the VISA Program is to provide phased intermodal sealift support to DoD in time of war, national emergency, or whenever the Secretary of Defense (SECDEF) determines it is necessary for national security.²⁰ Under the VISA program, the DoD does not lease ships, but rather contracts use of an intermodal system. These intermodal systems include not only a carrier's vessels, but also its trains, trucks, cargo handling equipment and tracking and control systems, as well as its traffic and logistic management services. This arrangement allows U.S. shippers to substitute among their ships during an activation, or even use their foreign-flagged vessels if those are more readily accessible.

While foreign owned ships are ineligible to participate in the VISA program, international ocean shipping corporations have found ways around this restriction. The titles of foreign owned ships are transferred to U.S. owned trusts, which enable them to be re-flagged in the U.S. and thus participate in the VISA program. These same vessels are then leased back to the original foreign companies. The question must be asked, where does true control and influence lie with respect to these ships? Additionally, does the existence of these types of loop holes degrade the utility of these programs?

The objective of the aforementioned U.S. legislative acts and subsidy programs is the preservation of an adequate fleet of U.S. flagged merchant vessels to support U.S. economic interests while providing an adequate fleet of commercial vessels with militarily useful features to meet strategic sealift requirements in peacetime and in war. While the stated objective of these programs is clear, these programs are incapable of meeting their objectives. In addition to potential foreign influence of program participants, levels of participation in maritime security and subsidy programs are inadequate. They are driven by government funding rather than an analysis of economic and strategic sealift requirements. Meeting growing U.S. strategic sealift demands requires more than an adequate supply of U.S. flagged vessels, it requires trained and qualified seafarers.

Maritime Manpower Supply

The 2000 Baltic and International Maritime Council (BIMCO) merchant seafarer manpower study results confirm the growing international shortage of qualified seafarers and the shift of the manpower industry center of gravity. While the world supply of rated seafarers remains adequate, the BIMCO study indicates a 4 percent deficit in qualified officers and predicts a 12 percent deficit by 2010.²¹ Equally as important, the study confirms the center of gravity of the manpower industry has continued to move away from the traditional maritime countries in Europe, Japan and North America towards countries in the Far East, the Indian Subcontinent and Eastern Europe.²² Ship's masters and crews from these regions may be unwilling or discouraged from transporting U.S. war materials into a theater conflict which their nations do not support. TRANSCOM planners must take note of this trend, in light of experiences during the Gulf War and

given the possibility of future conflicts in areas such as the Spratley Islands, Taiwan or former Eastern Block countries.

Equally as important as the movement of the international manpower center of gravity, is the decline in the number of U.S. mariners. The shrinking pool of American mariners is a serious problem in terms of meeting our future strategic sealift requirements. The number of civilian American sailors has declined from 100,000 in 1960 to approximately 20,000 in 1996.²³ The significance of this trend is magnified by the fact that both the Military Sealift Command and commercial shipping companies will be drawing from this shrinking manpower pool in times of conflict. A 1996 MARAD report estimated that there are currently 7,582 seagoing billets on ocean going U.S. flagged vessels, including billets aboard government owned reserve ships in active or reduced operating status.²⁴ In the event the Ready Reserve Forces (RRF) ships are activated for a period exceeding four months, an additional 4,000 billets are created.²⁵ However, manning requirements can not be evaluated strictly by the number of required billets alone. The total number of individuals required to crew a vessel taking into account individuals on sick leave or vacation is referred to as the establishment. The current U.S. establishment is three crews for two ships or a ratio of 1.5.²⁶ This means that in the event that the RRF is activated, 15,373 sea going billets would require filling. However, the current pool of active qualified seafarers is estimated at 8,221. In the case of the Gulf War, MARAD needed nearly 4,200 additional commercial mariners to crew the RRF.²⁷ Many of those that answered the call and filled these additional billets were retired seafarers. However, this may not be an option in the future.

In 1991 the United States ratified the earlier 1978 Standards of Training, Certification and Watchkeeping (STCW) for Seafarers convention. The STCW established revised standards for mariner training, manning and licensing procedures. Adoption of the STCW and the subsequent changes to the Code of Federal Regulations make it more difficult for seafarers to obtain or maintain both traditional merchant marine documents and satisfy the new STCW requirements. These new regulations will have the greatest impact on retired mariners or those not holding active seagoing billets. It was this pool that was called upon to fill manning shortfalls during Operation Desert Storm. The STCW will effectively further reduce the pool of U.S. merchant mariners capable of sailing DoD surge and sustainment sealift assets.

Ship Registry

The number of active ships on the U.S. registry has steadily declined since the 1940s. In 1940, the U.S. flagged merchant fleet numbered 2,000, while by 1997 this number had dwindled to 309 vessels. The U.S. fleet's share of the international shipping market reflects a similar decline. In 1950, U.S. carriers commanded a 43% share of the world market, compared to a 4% market share in 1995.²⁸ Ironically, the origin of this decline can be traced back to early legislation intended to preserve and strengthen the U.S. flag merchant fleet. Section 27 of the 1920 Merchant Marine Act, otherwise known as the Jones Act, is a prime example of legislation that has outlived its usefulness. Under this act, vessels engaged in U.S. domestic commerce must be American built, crewed, registered and repaired. Acts such as this effectively prohibit U.S. flag ship owners and operators from taking advantage of the shifting international economy and cost effective

labor resources. Some of the principle reasons for the decline of the U.S. flagged fleet are:

- The level of protection for seafarer health, welfare and safety may be lower on non-U.S. flagged ships.
- The regulatory framework in several countries, including key U.S. trading partners, may enable foreign vessels to operate at lower cost, or with preferential treatment compared to U.S. carriers.
- Foreign-flagged ship operators often do not pay corporate income taxes.
- The only U.S. corporate income taxes paid by foreign flagged owners are taxes paid on their U.S. shore-based facilities and personnel, which in many cases are non-existent. While U.S. flagged vessels are subject to all the taxes and regulatory laws applicable in the U.S..²⁹

Globalization of the World Maritime Industry

The World Maritime Industry is becoming a global industry. Mergers have created international mega companies engaging in vessel sharing agreements, alliances and consortia, in an effort to increase efficiency and profitability. Two of the largest ocean shipping alliances are the Grand Alliance and the Global Alliance. These groupings of ocean carriers or alliances are significant in that many of the corporate members are owned, controlled or affiliated with foreign governments. These Alliances may in fact subject U.S. ocean shipping companies to foreign influence. Ocean shipping alliances may delay or prohibit DOD shipments from reaching a future theater of war. Alliance partners often divide sailings on key routes, share use of common carrier services and share land-side facilities in an effort to increase efficiency. In the event that an alliance

partner fails to support a U.S. contingency operation, defense related cargoes may not be transported on the next scheduled sailing on a key route or may not be handled at the closest port in a theater of operations. Additionally, corporate mergers, alliances and trusts bring into question whether or not much of the U.S. flag merchant fleet is effectively under U.S. control. Corporate mergers pose a similar threat to U.S. strategic sealift availability. Between 1997 and 1998, no fewer than 14 of the top container carriers were involved in some form of merger activity.³⁰ If this trend continues, it is predicted that the worldwide liner industry will be dominated by as few as 4 or 5 mega-carriers in the near future.³¹

Ideally, future strategic sealift requirements would be met through the expansion of the military sealift fleet. However, this is not a viable option given rapidly expanding sealift requirements, current financial constraints and the reluctance of lawmakers and military planners to fund such an expansion at the expense of modernizing offensive forces. It is for these reasons that DoD planners intend to use commercial shipping extensively to sustain future military operations. While it is often the military sector that drives changes in the commercial sector, in the case of ensuring future strategic sealift requirements are met, these roles are reversed. It is TRANSCOM planners that must adapt to trends in the commercial maritime industry, changes in global manning, the decline of the U.S. flag merchant fleet and the globalization of the ocean shipping industry. Additionally, given the decline of the U.S. flagged merchant fleet, a trend which does appear to be changing in the near future, the use of foreign flagged merchant ships will have to be factored into any future contingency operation.

The first area that will require greater emphasis is containerization.

Containerization of military cargo is not a new concept, over 48,000 TEU of cargo were delivered in the Gulf War Theater of Operations.³² However, there was reluctance to the use of containers, especially with respect to containerizing ammunition. Additionally, there was concern that the containerization and shipment of unit equipment would result in broken shipments, and thus delays in marrying up troops with equipment in theater. Advances in both military and civilian container tracking systems, have resulted in greater in-transit visibility, and help avoid broken shipments. However, the issue of tracking system compatibility must be addressed between commercial carriers and the DoD. Additionally, while Turbo Intermodal Surge (TIS) exercises have demonstrated the viability of containerizing surge lift continued emphasis is required to standardize and streamline procedures. Through continued expansion of containerization efforts, TRANSCOM planners will be able to capitalize on the extensive sealift capabilities of both U.S. and foreign container ship fleets and their associated intermodal systems. Through the utilizations of commercial management and cargo tracking systems, DoD logisticians can devote greater attention to long range planning rather than duplicate the efforts of a commercial carrier.

Another element of the containership revolution which deserves attention is the requirement for highly developed port facilities and associated infrastructures to support the current and future generations of containerships. While during the Gulf War, Saudi Arabian modern deep water ports facilitated the movement of vast amounts of containerized cargo, future theaters maybe undeveloped. The limitations imposed by inadequate port facilities could be mitigated through the utilization of heavy lift crane

ships from the RRF, leased feeder vessels and lighters³³ to transship DoD cargo in theater. This option would minimize the need to have highly developed ports giving TRANSCOM planners greater flexibility and control over the movement of material. Additionally, in the event a feeder vessel refuses to deliver their cargo in a combat zone, assets would be available to transfer the cargo to another vessel.

Another area requiring attention is the globalization of the ocean shipping industry. The use of commercial shipping assets to meet sealift requirements will inevitably require the support of multinational shipping companies and alliances. It is essential that company representatives be involved in the deliberate planning process. Through expanded corporate involvement in the planning process and planning exercises, potential difficulties or conflicts can be identified and resolved prior to the commencement of contingency operations. Additionally, through the early formulation and delineation of DoD sealift requirements, commercial ocean shippers can develop shipping plans which provide DoD optimal sea lift support.

The decline of the U.S. flag merchant fleet and supply of U.S. seafarers are unavoidable facts. One additional unforeseen consequence of the decline of the U.S. merchant fleet is that many qualified U.S. mariners may be employed on foreign vessels, effectively further reducing the pool of seafarers available to crew U.S. ships and the ships of the RRF in times of national emergency or conflict. TRANSCOM planners will have to examine closely the combined effects of changes to U.S. codes and the declining number of U.S. mariners sailing aboard U.S. flag vessels.

While much has changed since the Gulf War, U.S. reliance on commercial shipping to provide surge and sustainment sealift has not. In fact, with the loss of

overseas bases and the restructuring of U.S. forces, lift requirements have increased. However, during this same period the U.S. flagged fleet and American seafarer labor supply have declined. Additionally, the world commercial shipping industry has evolved, driven by a world economy, which requires ocean shippers to capitalize on the economy of scale and a shifting foreign labor pool. Containerization is becoming the preferred method for transporting world commercial goods and will inevitably be the means by which U.S. strategic sealift is provided in the future. The globalization of the industry, the use of foreign ships and crews, present planners with many unique challenges. These considerations will be an integral part of any future contingency sealift plan. Future sealift plans must be dynamic and evolve with the international commercial shipping industry. TRANSCOM must develop new techniques and procedures to make more efficient use of commercial intermodal systems. While the CINC's must generate TPFDDs which incorporate commercial developments. The level of corporate involvement in deliberate planning process must be expanded in response to the increasing complexity of the international corporate environment. The shift in international and U.S. seafarer manning and the adoption of the STCW Convention must be reevaluated in terms of there potential impact on the manning of the U.S. commercial fleet and the RRF. These challenges and recommendations presented in this paper are not intended to be all encompassing, but rather, are intended to highlight the need for continued study and evaluation by TRANSCOM planners

NOTES

¹ David Foxwell, "Supply, support, sea and speed," Jane's International Defense Review, 1 (June 1999): 71.

² "National Transportation Institute National Defense Role." At "Transportation Institute Page." "<http://www.trans-inst.org/national_def_role.html> [28 November 2000], 8.

³ Ibid.

⁴ "Moving U.S. Forces: Options for Strategic Mobility." <http://www.fas.org/man/congress/1997/cbo_mobility/chap_03.htm> [15 December 2000], 8.

⁵ "National Transportation Institute National Defense Role." At "Transportation Institute Page." "<http://www.trans-inst.org/national_def_role.html> [28 November 2000], 11.

⁶ Ibid.

⁷ James K. Matthews and Cora J. Holt, So Many, So Much, So Far, So Fast (Washington DC: GPO, 1996), 125.

⁸ Feeder vessels are vessels normally used for local or coastal transport (for carriage of cargo and or containers) to and from ports not scheduled to be called by the main (ocean) vessel, directly connecting these ports to the main (ocean) vessel.

⁹ Matthews, 136.

¹⁰ Ronald Robinson, Crisis Response: Adequacy of U.S. National Security Sealift Policy (Washington, DC:GPO, 1998), 2.

¹¹ Department of the Navy, United States-1997 Posture Statement. (Washington, DC: 1997), 5.

¹² "National Transportation Institute National Defense Role." At "Transportation Institute Page." "<http://www.trans-inst.org/national_def_role.html> [28 November 2000], 8.

¹³ "Successful Policies Sustain U.S. Fleet, Retain Sealift Capability, Report Shows." <<http://www.us-flag.org/sucpolsususf.html>> [13 January 2001], 2.

¹⁴ Robert Mottley and Chris Gillis, "U.S. ports and superships." American Shipper, (September 1998): 96.

¹⁵ Phillip Damas, "Post-Panamax containership bonanza." American Shipper, (September 2000), 81.

¹⁶ National Oceanographic and Atmospheric Administration, The Oceans and National Security (Washington, DC: 1998), 12-13.

¹⁷ "Importance of Jones Act Fleet to National Security." 29 July 1999. <<http://www.mctf.com/natlsec.htm>> [12 January 2001], 1.

¹⁸ Stephen J. Thompson, "The Maritime Security Program (MSP) in an International Commercial Context: A Discussion." 28 October 1998, <<http://www.cnie.org/nle/mar-26.html>> [8 January 2001], 3.

¹⁹ "Statement by U.S. Secretary of Transportation Federico Pena On Signing of the Maritime Security Act." 8 October 1996. <<http://www.dot.gov/affairs/1996/10896st.htm>> [12 January 2001], 1.

²⁰ Congress, House, Committee on National Security, The Quadrennial Defense Review: Hearing before the Committee on National Security, 105th Cong, 1st sess., 16 April 1997, 123.

²¹ International Shipping Federation, The BIMCO/ISF 2000 Manpower Update (London: 2000), 2.

²² Ibid., 3.

²³ Jim Morris and Kevin Moran, "U.S. merchant fleet rapidly fading away." 20 August 1996. <<http://www.chron.com/content/interactive/special/maritime/96/08/21/part4.html>> [18 December 2000], 1.

²⁴ David G. Harris and Richard D. Stewart, "US Surge Sealift Capabilities: A Question of Sufficiency." Parameters, (Spring 1998): 71.

²⁵ Ibid.

²⁶ David G. Harris and Richard D. Stewart, "US Surge Sealift Capabilities: A Question of Sufficiency." Parameters, (Spring 1998): 71.

²⁷ Matthews, 126.

²⁸ "Moving U.S. Forces: Options for Strategic Mobility." <http://www.fas.org/man/congress/1997/cbo_mobility/chap_03.htm> [15 December 2000], 5.

²⁹ Stephen J. Thompson, "The Maritime Security Program (MSP) in an International Commercial Context: A Discussion." 28 October 1998, <<http://www.cnie.org/nle/mar-26.html>> [8 January 2001], 5-6.

³⁰ Damas, 78.

³¹ National Defense Transportation Association, Report of the NDTA Military Sealift Committee Working Group on Maritime Policy (Washington, DC: 2000), 13.

³² Lieutenant General Daniel G. Brown, "Global Intermodalism, Transportation Research Board Global Intermodal Conference, Long Beach, CA: February 23, 2000, <<http://214.3.17.158/speeches/000301-7.html>> [12 December 2000], 2.

³³ A lighter is a general term for a broad, flat-bottomed boat used in transporting cargo between a shore. The distinction between a lighter and a barge is more in the manner of its use than in equipment "lighter" refers to a short haul, generally in connection with loading and unloading operations of a harbor.

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